

Appl. No. 10/574,659
Amdt. dated June 3, 2009
Reply to Office action of March 3, 2009

AMENDMENTS TO THE DRAWINGS:

Please amend the drawings by adding a new sheet of drawings including new Figure
4.

Attachment: New sheet of Drawings

REMARKS

Claims 30-41 and 43 are presently in the application. Claims 1-29 and 42 have been canceled.

The drawings have been objected to as failing to illustrate the valve opening located on the valve housing opposite the conical face. This language was added to claim 29 by the amendment filed on January 28, 2009, and similar language is present in new claim 43.

Applicants' specification is clearly directed to a valve, particularly, to a fuel injector valve. Such valves are known from US 6,062,531, the US equivalent of DE 196 50 865, which is referred to at page 1 of the original specification. See, paragraph 4 of the specification. US 6,062,531 and DE 196 50 865, in turn, refers to EP 0 690 223 A2. EP 0 690 223 A2 discloses a fuel injector valve having a valve housing which has an actuator chamber and a laterally located inlet bore that communicates with a high-pressure inlet, a cable outlet extending from the actuator chamber, an actuator with a ram supported in the actuator chamber, the actuator chamber having a sealing face on the end of the actuator chamber and a corresponding annular sealing face on the actuator, the actuator being operable to cause an orifice leading to the combustion chamber to be opened or closed, and with the orifice being located on the valve housing opposite the sealing face of the actuator chamber.

Applicants have submitted herewith a new Fig. 4, which is simply a copy of Fig. 1 from EP 0 690 223 A2 labeled "Prior Art." Fig. 4 shows an actuator chamber or axial chamber 7 having a sealing face located at one end of the actuator chamber, an opening located in the valve housing proximate an end of the actuator chamber opposite from said one

end of the actuator chamber, an actuator 8 operable to open and close an opening 11 located in the valve housing proximate the end of the actuator chamber opposite from said one end of the actuator chamber.

The examiner's attention is also directed to EP 1 096 136 (cited in the PCT search report and in applicants' IDS filed on April 4, 2006) and its U.S. equivalent, U.S. 6,390,385, which may be more relevant to applicants' invention than EP 0 690 223. This publication includes, for example, a Fig. 1 showing the background or prior art to applicants' invention. If the examiner so desires, applicants would be willing to substitute Fig. 1 of EP 1 096 136 for Fig. 1 of EP 0 690 223, as proposed Fig. 4 in this application. Of course, the applicants will also consider any suggested modification of existing Fig. 1 that the examiner might have.

Claims 29-41 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The examiner finds that the language "the piezoelectric actuator being operable to cause a valve opening, which is located on the valve housing opposite the conical face" is unsupported by the original disclosure.

The rejection has no basis in fact. Paragraph 25 of applicants' original specification teaches that:

The actuator 30 may be embodied as a piezoelectric actuator unit. The operative principle provides that by means of electrical voltage pulses, which are delivered to the actuator 30 via a cable, changes in length of the ram 31 of the actuator 30 cause a valve opening to be briefly opened; this opening is located (not shown in the drawing) on the end of the valve housing 10 diametrically opposite the conical face 14. As a result, the fuel can be injected into the combustion chamber of an internal combustion engine.

Thus, the original specification describes Fig. 1 as showing an actuator 30, which may be embodied as a piezoelectric actuator unit, which undergoes a change in length to cause a valve opening to be briefly opened. This opening is not shown in the drawings, but is described as being located on the end of the valve housing 10 diametrically opposite the conical face 14. Thus, the original specification does, in fact, support the claim language.

In view of the above, withdrawal of this rejection is requested.

Claims 29-41 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Again, this rejection concerns the language "the piezoelectric actuator being operable to cause a valve opening, which is located on the valve housing opposite the conical face." The examiner finds no enabling disclosure for this language.

The original specification, particularly paragraph 25, together with the prior art would enable one of ordinary skill in the art to make and use the invention defined in the claims. Thus, withdrawal of this rejection is requested.

Claims 29-41 stand rejected under 35 U.S.C. 112, second paragraph, as indefinite. The examiner finds that the claims "are replete with grammatical errors."

Applicants have reviewed the claims and find them to be easily understood. However, in order to satisfy the examiner, claim 29 has been rewritten as new claim 43 in accordance with current Office practice.

Claim 43 requires "a cable outlet proximate one end of the actuator chamber," "a bore communicating the cable outlet with the actuator chamber," an "actuator chamber having a conical sealing face located at said one end of the actuator chamber" and "said bore and cable

outlet being sealed off from the actuator chamber when the actuator cap is seated on the conical sealing face.”

The language of claim 29, “the piezoelectric actuator being operable to cause a valve opening, which is located on the valve housing opposite the conical face,” has also been amended to read “an opening located in the valve housing proximate an end of the actuator chamber opposite from said one end of the actuator chamber.”

Also, the examiner finds that the language “the longitudinal axis of the valve housing,” in claim 31, lacks a proper antecedent. New claim 43 requires a “valve housing having a longitudinal axis.”

In view of the above, withdrawal of the section 112, second paragraph rejection is requested.

Claims 29-41 stand rejected under 35 U.S.C. 103(a) as unpatentable over Cerny (US 5,288,025) in view of the admitted prior art of applicants’ Fig. 1.

Claim 29 has been canceled and replaced by new independent claim 43.

Claim 43 is directed to a valve for controlling fluids comprising: a valve housing 10 having an actuator chamber 11 and a laterally located inlet bore 13 for connection with a high-pressure inlet 12, said valve housing having a longitudinal axis, a cable outlet 17 proximate one end of the actuator chamber (the end shown in Figs. 2 and 3), a bore 16 communicating the cable outlet with the actuator chamber, a piezoelectric actuator 30 comprising a ram 31 and an actuator cap 32 supported in the actuator chamber, said actuator chamber having a conical sealing face 14 located at said one end of the actuator chamber and the actuator cap 32 having a

corresponding annular sealing face 33, said bore 16 and cable outlet 17 being sealed off from the actuator chamber 11 when the actuator cap 32 is seated on the conical sealing face 14, an opening (such as, the opening 11 in Fig. 4) located in the valve housing proximate an end of the actuator chamber opposite from said one end of the actuator chamber, said piezoelectric actuator 30 being operable to open and close the opening (such as, the opening 11 in Fig. 4) located in the valve housing proximate the end of the actuator chamber opposite from said one end of the actuator chamber, said actuator chamber comprising at least one additional inlet bore 13, wherein the inlet bores 13, 13 are located symmetrically around the longitudinal axis of the valve housing.

Cerny does not teach or suggest: (1) a piezoelectric actuator; (2) a cable outlet proximate one end of the actuator chamber; (3) a bore communicating the cable outlet with the actuator chamber; (4) an actuator chamber having a conical sealing face located at said one end of the actuator chamber; (5) the bore and cable outlet being sealed off from the actuator chamber when the actuator cap is seated on the conical sealing face; (6) an opening located in the valve housing proximate an end of the actuator chamber opposite from said one end of the actuator chamber; and (7) the piezoelectric actuator being operable to open and close the opening located in the valve housing proximate the end of the actuator chamber opposite from said one end of the actuator chamber.

The examiner uses the admitted prior art of Fig. 1 for a teaching of a piezoelectric actuator. However, the examiner has completely ignored the language "the piezoelectric actuator

being operable to cause a valve opening, which is located on the valve housing opposite the conical face" in claim 29 and now in claim 43.

"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). This includes limitations which the examiner considers indefinite and limitations which the examiner considers to be unsupported by the original specification (i.e., new matter). See, MPEP 2143.03.

Thus, it is a fundamental error in claim construction for the examiner to simply ignore the language "said piezoelectric actuator being operable to open and close the opening located in the valve housing proximate the end of the actuator chamber opposite from said one end of the actuator chamber" in claim 43.

The examiner proposes that it would have been obvious to one of ordinary skill in the art to combine the teachings of Cerny with the teachings shown in the admitted prior art of Fig. 1. However, Cerny's invention is concerned with improving the accuracy of fuel delivery to an engine's combustion chamber using a pulse width modulated type fuel injector (see, col. 1, ll. 34-38). Cerny teaches an improved fuel injector for an internal combustion engine which produces highly accurate fuel delivery control by providing a precise closing of the valve without secondary openings caused by rebound or bouncing of the valve from its seat surface after initial closing. Valve rebound is eliminated by a hydraulic cushion formed between parallel surfaces of the movable valve and its stationary guide whereby a thin boundary layer of liquid fuel caught between closely spaced surfaces is compressed just prior to engagement of the valve with its

valve seat. This generates an opposing force to the force tending to close the valve. See, Abstract.

In other words, Cerny's teachings are concerned strictly with the end of the fuel injector having the fuel opening 74 leading to the combustion chamber. See, col. 4, ll. 18-20.

In contrast, the prior art of Fig. 1 teaches the state of the art of fuel injector design at the opposite end of a fuel injector from that concerned in the patent to Cerny. This is made clear by the language of claim 43. Thus, the prior art of Fig. 1 has nothing to do with the invention disclosed by Cerny.

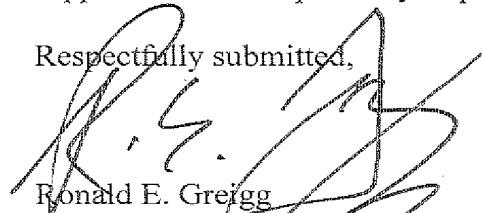
If one were to actually combine the teachings of Cerny and the prior art of Fig. 1, without the benefit of hindsight, the resulting structure would be an injector valve having one end (specifically, the end with the injector openings for fuel) constructed according to the teachings of Cerny and the opposite end having the cable outlet (17 in Fig. 1) constructed according to the teachings of Fig. 1. Thus, one of ordinary skill in the art would never have arrived at the subject matter defined in applicants' claim 43.

The Commissioner is hereby authorized to charge any necessary fees in connection with this communication to Deposit Account Number 07-2100.

Appl. No. 10/574,659
Amdt. dated June 3, 2009
Reply to Office action of March 3, 2009

Entry of the amendment and allowance of the application are respectfully requested.

Respectfully submitted,



Ronald E. Greigg
Registration No. 31,517
Attorney of Record
Customer No. 02119

GREIGG & GREIGG, P.L.L.C.
1423 Powhatan Street
Suite One
Alexandria, VA 22314

Telephone: (703) 838-5500
Facsimile: (703) 838-5554

REG/JFG/ncr

J:\Bosch\R306280\Reply to 3-3-09 OA.wpd

Enclosure: New Figure 4